WILLIAM H. TAFT MEMORIAL BRIDGE
(Connecticut Avenue Bridge)
Connecticut Avenue, Spanning Rock Creek
Rock Creek Park
Washington, District of Columbia

HAER NO. DC-6



PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
NATIONAL PARK SERVICE
Department of the Interior
P.O. Box 37127
Washington, D.C. 20013-7127

HAER, DC, WASH, 560-

United States Department of the Interior
National Park Service
Washington, D.C. 20240

HISTORIC AMERICAN ENGINEERING RECORD
SITE DATA FORM

STATE: Washington, District of Columbia
COUNTY:
TOWN OR VICINITY:

HISTORIC NAME: Taft, William H. , Memorial Bridge
HAER NO.: DC-6

SECONDARY OR COMMON NAMES: Connecticut Avenue Bridge

COMPLETE ADDRESS (DESCRIBE LOCATION FOR RURAL AREAS): Connectiuct Avenue, spanning Rock Creek, Rock Creek Park

DATE OF CONSTRUCTION: 1906
ENGINEER, BUILDER, OR FABRICATOR: George S. Morrison
Edward P. Casey, consulting architect

SIGNIFICANCE (TECHNOLOGICAL AND HISTORICAL, INCLUDE ORIGINAL USE)

STYLE (IF APPROPRIATE)

MATERIAL OF CONSTRUCTION (INCLUDE STRUCTURAL SYSTEMS): steel and concrete

SHAPE AND DIMENSIONS (SKETCHED FLOOR PLANS ON SEPARATE PAGES ARE ACCEPTABLE)

EXTERIOR FEATURES OF NOTE

Lions flanking both approaches to bridge, designed by R. Hinton Perry,sculptor

INTERIOR FEATURES OF NOTE (DESCRIBE MECHANICAL SYSTEMS, MACHINERY OR EQUIPMENT)

MAJOR ALTERATIONS AND ADDITIONS WITH DATES

lions restored in 1985, other alterations unknown

PRESENT CONDITION AND USE

vehicular and pedestrian bridge

OTHER INFORMATION AS APPROPRIATE

SOURCES OF INFORMATION (INCLUDING LISTING ON NATIONAL REGISTER, PROFESSIONAL ENGINEERING SOCIETY LANDMARK DESIGNATIONS, ETC.)

H.P. Caemmerer, Washington: The National Capital (Washington,D.C., 1932)
also, plaque on bridge

COMPILER, AFFILIATION: Bill Lebovich, Historic American Engineering Record
DATE: May 15, 1987

HAER No. DC-6

Connecticut Avenue Bridge
(William H. Taft Bridge)
Spanning Rock Creek and Potomac Parkway
Washington
District of Columbia

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ADDENDUM TO:
William H. Taft Bridge
Connecticut Avenue, Spanning Rock Creek, Rock Creek Park
Washington
District of Columbia

PHOTOGRAPHS
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REDUCED COPIES OF MEASURED AND INTERPRETIVE DRAWINGS

Historic American Engineering Record
National Park Service
U.S. Department of the Interior
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# HISTORIC AMERICAN ENGINEERING RECORD

## CONNECTICUT AVENUE BRIDGE

ADDENDUM TO · **(William H. Taft Bridge)**
~~Addendum to~~ HAER No. DC-6

HAER
DC
WASH
580

Location: Connecticut Avenue Bridge spans the Rock Creek Valley gorge in the northwest section of Washington, D.C. Rock Creek, Beach Drive, and Cathedral Avenue each pass underneath one of its arches.

Date of Construction: 1897-1907.

Designer/Builder: Designed by George B. Morison, engineer, and Edward P. Casey, consulting architect; under the supervision of engineer W. J. Douglas of the District of Columbia Bridge Division. Foundations by Cranford Paving Company. Superstructure finished by District Construction Company. Lamps by sculptor Ernest C. Bairstow; cast by J. L. Motts Iron Works, New York. Lions by sculptor Roland Hinton Perry.

Present Owner: Department of Public Works, District of Columbia.

Present Use: Vehicular and pedestrian bridge.

Significance: Designed by prominent engineer George B. Morison, Connecticut Avenue Bridge was described at the time of its construction as the largest concrete arch in the world. This seven-arch span was erected without steel reinforcement, composed entirely of monolithic concrete masonry and molded concrete block. It was an inspiration to Washington bridge designers of the twentieth century.

Project Information: The documentation of Rock Creek and Potomac Parkway was undertaken as a two-year pilot project to help establish standards and guidelines for recording the structures and landscape features of park roads and parkways. This project was a joint effort of the Historic American Buildings Survey and the Historic American Engineering Record (HABS/HAER), a combined division of the National Park Service, Robert Kapsch, chief. The project was sponsored by the Park Roads Program of the National Park Service, John Gingles, deputy chief, Safety Services Division. The project supervisor was Sara Amy Leach, HABS historian.

The Washington-based summer 1992 documentation team was headed by landscape architect Robert Harvey (Iowa State University-Department of Landscape Architecture) who served as field supervisor; the landscape architects were Deborah Warshaw (University of Virginia) and Dorota Pape-Siliwonczuk (US/ICOMOS-Poland, Board of Historical Palaces and Gardens Restoration); the architects were Evan Miller (University of Colorado-Boulder), Steven Nose (University of Maryland), and Tony Arcaro (Catholic University). The historians were Tim Davis (University of Texas) and Amy Ross (University of Virginia). Jack E. Boucher made the large-format photographs; Air Survey Corporation of Sterling, Virginia, produced the aerial photography and digital mapping from which the site-plan delineations were made.

**History of the Crossing**

At the time Connecticut Avenue Bridge was first proposed in 1897, the area was served by a bridge less than 10 years old, but which had already proved inadequate to serve the growing northwest suburbs. That bridge, an iron-deck truss, had been built in 1888 slightly west and lower than the present Connecticut Avenue Bridge. Known as Woodley Lane Bridge, it had five 150' spans, and was 40' wide. This bridge came directly through one of the arches of the new bridge in a 1905 photo, taken during its construction.

The bridge at Woodley Lane was constructed under "peculiar circumstances" at an elevation justifiable only because limited funds were available at the time. It was removed because the proposed new bridge supplanted it for travel across the valley, and because it hindered the appearance of the new structure. Congress suggested that it be moved upstream to the National Zoological Park, but this never occurred.[1]

**Competition**

A competition was held for the design of the present structure. Three proposals included steel arches, but a wholly concrete design was selected. The winning design was by George S. Morison, a well-known railroad bridge designer. W. H. Breithaupt and L. L. Buck both presented proposals for a Melan-arch bridge. The competition and construction were supervised by engineer Walter J. Douglas of the District of Columbia's Bridge Division.

A bridge or viaduct across Rock Creek, on axis with the Connecticut Avenue extension, was authorized by Congress in its appropriation of March 3, 1897. The legislation called for designs to be secured through a competition. Morison, Buck, and Breithaupt--all of New York City--were invited to compete and sent a survey of the site to assist them with their designs. Letters of September 28, 1897, stated they could submit two designs if desired, but no more.

Each engineer agreed to participate. Five separate and distinct designs were sent: one by Morison and two by each of the others. Morison's design called for masonry construction. He also proposed a less expensive "modified construction" scheme at this time. The other four designs included at least steel reinforcement, and usually steel arches; each was assessed on the basis of cost, if it were to be executed in granite, sandstone, and concrete.

At $675,000 for concrete construction, Morison's scheme was not the cheapest, but his modified plan made his design more economical. Still, Breithaupt's design with both Melan and steel arches would have been less expensive. However, Morison was awarded first prize ($600); Buck's Melan arch was second ($400), though it was a costly scheme; and Breithaupt's Melan and steel, estimated at $503,000, was third ($200).[2] Two designs were not recognized: Breithaupt's all-steel project with a 410' center span flanked by four smaller arches, and a similar five-arch scheme by Buck with a central steel arch of 544' complemented by four Melan arches.[3] Sandstone and granite, though evaluated, were rejected outright. The report assessing entries recommended Morison's

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[1] U.S. Senate, Viaduct Across Rock Creek, District of Columbia (55th Cong., 2nd sess., 1898, S. Doc. 96). (Serial Set 3593).

[2] U.S. Senate.

[3] Henry Grattan Tyrrell, History of Bridge Engineering (Chicago: By the author, 1911), 343.

modified plan and suggested he be hired as consulting engineer. An appropriation of $250,000 was proposed to begin construction, to be used for abutments, foundations, and piers.[4]

**Morison's Winning Entry**

Morison's winning design had nine arches: five with a span of 150', four with an 82' span. The piers between the arches were 20' thick, except in the two cases where an 82' arch met a 150' arch, where the thickness was increased to 37'. Morison's bridge was remarkable for "the construction of a series of subordinate arches piercing the spandrel walls of the principal arches and resting upon them and on their haunches." These arches were considered "the conspicuous and characteristic feature of the design."[5]

Morison's first scheme had a 52' solid masonry width. His modified design called for the removal of the central section of this mass, leaving two masonry viaducts, each 16' wide, with a 20' space between. This space would be spanned by the floor system of structural steel and concrete. This modification would reduce the cost without diminishing its strength. Morison proposed sidewalks 10' wide on brackets projecting at intervals of 17', secured to the masonry by connections that ran entirely across the bridge. The brackets, to project about 9', would be cast-iron simulating masonry. The congressional report on Morison's design suggested an even greater space between the two viaducts, which would diminish the length of the projecting brackets to the proportion of a cornice.

The selection of Morison's design was explained: "The principal considerations leading to this decision were that the proposed bridge, being so conspicuously located on a fine residence avenue and in full view of a large area within which was the National Zoological Park, should be of a monumental character, and the masonry type above all others fulfilled this condition, as well as that of suitability." Metal construction was believed to require higher maintenance and to deteriorate with age. "High-class concrete would permit a much greater possible economy without sacrificing the proper qualities to be insisted on in the design." It was thought that concrete's preparation and use was never better understood than at the present time.[6] The design called for poured-in-place concrete with bush-hammered surfaces of granite-like concrete aggregate. Arch rings, quoins, and other trim would be pre-cast blocks of concrete aggregate. Edward P. Casey was credited for working out an attractive architectural view that contributed toward the success of Morison's entry.[7]

In 1905, the Office of Chief of Engineers wrote to Eli Rose of the Central Bridge Company, New York, in response to his request for information about the construction of arches and bridges of a considerable span in this country. In his inquiry, Rose had specified arches spanning 100-150', composed entirely of concrete (specifically "cement or concrete alone without wood or metal when done"). The chief of engineers lauded this Washington project:

> In reply I have to say that a notable example of this kind of structure is the Connecticut Avenue Bridge, now in process of construction, under the direction of the Commissioners of

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[4] U.S. Senate.

[5] U.S. Senate.

[6] U.S. Senate.

[7] Henry Goldmark to Charles Moore, Chairman of the Commission of Fine Arts, 16 December 1931. Project files, RG66.

> the District of Columbia, across Rock Creek, in this city. It is being built of a combination of molded concrete block and monolithic concrete masonry, and will be one of the largest masonry-arch bridges so far constructed. The total length of the bridge, including abutments, will be 1,341', and in width between faces of arch rings, 52'.[8]

By this time, the number of full-centered arches had been reduced to seven, with two abutments completing its length.[9]

The Office of the Chief of Engineers referred Rose to a June 1, 1905, Engineering News article on this bridge, or to the Commissioners of the District for further information. The Golden Gate Viaduct in Yellowstone National Park and Illinois Central Railroad bridges were also cited as feats of concrete construction.

**Designers**

Engineer George B. Morison (1842-1903) and Edward P. Casey (1864-1940), consulting architect, collaborated on the Connecticut Avenue Bridge. Morison, a graduate of Harvard Law School, was already a nationally known civil engineer by the time of this competition. Casey's career centered on Washington and government architecture.

Between 1880-89, Morison designed several truss bridges spanning the Missouri and Mississippi rivers for various railroad companies. The most outstanding was the open-hearth steel bridge that crossed the Mississippi Memphis (1892). Its 790' span held the record length for American railroad bridges until Hell Gate was built in New York City in 1917.[10] Morison's contributions were largely in the area of truss design. In 1900 he entered a masonry-arch design in the competition for Arlington Memorial Bridge in Washington, D.C. His scheme showed five limestone and granite arches varying from 172' to 183', with bascule draws at either end.[11] The Connecticut Avenue Bridge, his only structure executed in the capital, was also his last.[12]

**History of Construction**

Connecticut Avenue Bridge took a long time to build, but it was much acclaimed when finally finished. The foundations were begun in 1897 by Cranford Paving Company. The arch pilings, constructed in 1904--one year after Morison's death--were sunk to depths of 20' to 40'.

Centering used to build the arches during construction, employed Georgia and Virginia pine. The wood was kept saturated to protect against the threat of fire; the site was also equipped with a fire-fighting system.[13]

The bridge is noteworthy for having been constructed of pre-cast concrete blocks erected as forms and filled in behind with concrete. Approximately 50,000 cubic feet of concrete was used.

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[8] Office of the Chief of Engineers to Eli Rose, 9 August 1905. RG77.

[9] Office of the Chief of Engineers.

[10] David Plowden, Bridges: The Spans of North America (New York and London: W. W. Norton & Company, 1974), 137.

[11] Tyrrell, 102.

[12] Plowden, 299.

[13] Waldon Fawcett, "The Largest Concrete Bridge in the World," American Exporter (1908?): 88.

Contractors used a non-continuous method of building the arches in alternate blocks. No reinforcing steel was used in the arches, necessitating an immense amount of timber falsework.[14] Concrete materials for the bridge were extracted on site. Stone, quarried from deposits near the construction site, was crushed to make aggregate for the cast-stone quoins, moldings, balusters, and arch rings. This powdered gneiss created the gray tone for these details, while the concrete mixed with sand produced the buff color used for the large expanses of the elevation.[15]

The superstructure was finished by the District Construction Company in 1907. The extended period of construction was due to the lack of continuous appropriations, and the expenses soaring above what had been planned. At a cost of $846,331, the structure was soon dubbed the "Million Dollar Bridge."

The Connecticut Avenue Bridge was praised in professional journals at the time of its completion. A 1908 article in American Exporter remarked: "Nowhere else has there been an attempt to build so great a number of arches, or arches of such size, entirely of concrete and without the provision of any steel framing as a support for the mass."[16]

**Description**

Connecticut Avenue Bridge was the largest concrete bridge in world at the time it was constructed. In 1908, Waldon Fawcett wrote: "It is claimed that not even in Europe, where masonry construction is common, owing to the high cost of lumber and the relatively moderate cost of masonry, is there anything that approaches the engineering attributes of the District of Columbia bridge."[17]

The span is composed of two U-shaped abutments and seven full-center arches. Of the seven semi-circular main arches, five spans are 150' wide and two are 82'. Cathedral Avenue passes under one arch, Beach Drive under another, and Rock Creek through a third. The main arches are hingeless and unreinforced.[18] Six full-center spandrel openings above each main arch, with spans of 14' each, are supported by transverse piers 3' thick. There are similar arches above each pier, but they are obscured by the facing wall. The outermost of the main arches also have closed spandrels. Its end piers are 37' thick, and those separating the large arches are 20' thick.

The bridge is 1,341' long, with a length between abutments of 1,068'. The vertical clearance for the highway underneath is 50', and bridge stands 125' above creek. It originally had a 35' wide roadway, today widened to 40'. The sidewalks are 5'-6" wide.[19] Four feet of earth fill is under the

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[14] "The Connecticut Avenue Concrete Arch Bridge in Washington," Engineering News 53 (1 June 1905), 571-72.

[15] Department of Highways, Washington, D.C., A Pictorial Report on Highway Bridges and Structures in the District of Columbia (Washington, D.C.: Department of Highways, 1948), 35.

[16] Fawcett, 87.

[17] Fawcett, 87.

[18] Tyrrell, 404.

[19] District of Columbia-Department of Public Works, Annual Bridge Inspection Report, Connecticut Avenue, 22 February 198?.

roadway. The deck has granite curbs, brick gutters, and an asphalt surface.[20]

Four lions atop large concrete pedestals adorn the termini of the bridge. At the east end, stone panels on the pedestals are engraved with the names of personalities involved with the construction of the bridge. Listed are the engineer commissioners and the commissioners of the District of Columbia at the time of completion. The cast-concrete lions were designed by Roland Hinton Perry (1870-1941).

Simple iron verticals between cast-stone balusters constitute the railing. Above each pier, cast pilasters support ornamental standards.

Above the two outermost piers at each end of the bridge the lamps are paired; single standards surmount the center piers. The twenty-eight lamps that originally stretched along the 4,000' of roadway that comprised the structure and its approach were designed by sculptor Ernest C. Bairstow. These ornamental cast-iron standards, costing $1,000 each, measure 25' tall; the eagle at the top, which stands on an orb, is 2-1/2' tall with a wing span of more than 4'. The upper portion of the fixture includes a double cluster of electric lamps with each grouping enclosed in a large frosted globe; garlands embellish the bases, the capitals are acanthus leaves, and scrolls project out toward the globes on either side of the standard.

**Streetcar Line Suggested**

The response to proposals for a streetcar line across the Connecticut Avenue Bridge highlights the debate over its character. The Commission of Fine Arts (CFA), established in 1910 to advise the government on artistic matters, has long been at the center of the efforts to preserve the structure's historic form. Col. Spencer Cosby represented the CFA on a 1911 proposal to add traction-company lines to the bridge, in a letter to Cuno H. Rudolph, president of the D.C. Board of Commissioners. The CFA opposed on aesthetic grounds the disturbance of this thoroughfare, which it felt would result from adding a double line of tracks to its deck. Initially it seemed willing to allow the practical consideration and great need for this service to override aesthetic objections.[21] When the proposal came up for review, however, the CFA failed to approve it.

The question of a streetcar line was again addressed in 1934. In response to a petition filed by the Capital Transit Company with the Public Utilities Commission asking that the line now across Calvert Street Bridge be transferred to Connecticut Avenue Bridge, Congress introduced a resolution to "prevent the mutilation of Taft Bridge." The Public Utilities Commission had ordered an investigation of the span to determine if it could carry the streetcars. Congress expressed its concern that this would create a "bottleneck" over an already congested route, as it would leave room for only one automobile on each side of the streetcar. Thus, this plan was rejected, too. Congress decided, however, that a new Calvert Street Bridge should be designed with streetcars in mind.[22]

**Changes to the Bridge**

The bridge has seen changes in name and condition in the eighty-five years since its

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[20] District of Columbia-Department of Public Works, National Bridge Inventory: Structure Inventory and Appraisal, Connecticut Avenue, Last inspection of this site 12/90. Computerized database at DPW.

[21] Spencer Cosby, Col. U. S. Army, to Cuno H. Rudolph, President of the Board of Commissioners of the District of Columbia, 17 June 1911. Project files, RG66.

[22] "Trolley Route on Taft Bridge Rapped in Bill," The Washington Post, 6 June 1934.

completion, but the form remains the same. It was rededicated the William H. Taft Bridge in 1931 because President Taft had lived nearby and had been in the habit of walking across it. In 1936, the asphalt-covered roadway was expanded from 35' to 40', necessitating a reduction of the sidewalks to 5'-6".

Perry's lions were restored in 1965 by sculptor Renato Lucchetti. Lucchetti used latex to ensure that the new concrete would not separate from the older material. He was assisted by Franklin Gribble, an employee of the Bridge Division of the D.C. Department of Highways and Traffic, who acted as his apprentice.[23]

In 1985, District officials were convinced of a plan to erect 8' fences along the Calvert Street and Connecticut Avenue bridges to prevent suicides. Newspapers cited the average number of deaths per year from these two spans as five. The CFA approved the barrier design, with its wrought-iron picket fence rising 3-1/2' above the handrail.[24] Barriers were erected on the Calvert Street Bridge first, and after much contention about their disruptive appearance and questions of their efficiency, the plan to install railings on Connecticut Avenue Bridge was abandoned.

In 1992, two unmarked telephone boxes stand on the bridge. An aluminum guardrail secures one section on the upstream side of the deck where the railing was broken through, and its iron bars displaced. From streetcars to suicide railings, the keepers of Connecticut Avenue Bridge have garnered a long history of putting aesthetic considerations above practical concerns. However, its present condition suffers from the absence of a comprehensive maintenance plan.

Prepared by:
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Summer 1992

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[23] C. H. Atherton to Nicholas E. Bosta, Procurement Office, D.C. Government, 6 October 1965. Central files, RG66.

[24] Benjamin Forgey, "The View of the Bridges," Washington Post, 27 July 1985.

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